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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/785,500	02/23/2004	Randolph B. Haagens	200311648-1	9871
22879 7590 06/11/2007 HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400			EXAMINER SCHELL, JOSEPH O	
			ART UNIT 2114	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/785,500

Applicant(s)

HAAGENS ET AL.

Examiner

Joseph Schell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 11-17, 19-26, 29 and 30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 9, 11-14, 16, 17 and 19-25 is/are rejected.
- 7) ☒ Claim(s) 5-8 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

Claims 1-9, 11-17, 19-26 and 29-30 have been examined.

Claims 5-8, and 15 have been objected to as containing allowable subject matter, yet dependant upon rejected base claims.

Claims 26, 29 and 30 are allowable.

Claims 1-4, 9, 11-14, 16-17 and 19-25 have been rejected.

Response to Arguments

1. Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

2. Claim 11, the last line reads "operating in a SCSI device." This is not an active method and should be added to the preamble or include a "wherein" transition.

Allowable Subject Matter

3. Claims 5-8, and 15 have been objected to as containing allowable subject matter, yet dependant upon rejected base claims.

Claims 26, 29 and 30 are allowable.

Within claims 5-8, 15 and 26 the examiner deems the novel limitation to be, within the entirety of each claim, the tracking of the number of outstanding writes for marking transitions with task attributes.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 22-24 are rejected under 35 U.S.C. 101 as being non-statutory.

Claims 22-24 state an article of manufacture comprising a controller usable medium.

According to the last sentence of paragraph 70 of the specification, a computer-readable medium can be any structure, device, component, product, or other means that can communicate, propagate or transport the program for use. This use of communication signals, which is seemingly being claimed, is not considered a statutory embodiment by the Office.

Additionally, the specification uses "computer-readable medium" language and does not support the "controller usable medium" language in the claims. The claims should be changed to "computer-readable medium" to conform with MPEP §1.75(c).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4, 9, 11-14, 16-17, 19, and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamagami ('589) in view of Ozdemir (US Patent 6,915,354).

6. As per claim 1, Yamagami ('589) discloses a device capable of usage in a storage system including an initiator, a primary target, and a secondary target (as shown in figure 1a, the host 100a is the initiator, the storage 110c is the primary target, and the storage 100b is the secondary target) the device being capable of configuration for asynchronous remote mirroring functionality and comprising:

a target controller capable of communicating with the initiator and performing operations requested by the initiator (column 2 lines 31-33); and
a process on the target controller capable of receiving a stream of command requests from the initiator, performing the requested commands, and asynchronously relaying the requested commands to a secondary target while ensuring precedence graph equivalence between received and relayed commands, the process embedding task attributes in the relayed commands capable of increasing concurrency in commands performed by the secondary target (column 2 lines 33-42).

Yamagami ('589) additionally discloses that some companies are working to make iSCSI a dominant standard for SANs (column 1 lines 38-41).

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Yamagami ('589) does not expressly disclose the system wherein the target controller is a Small Computer Systems Interface (SCSI) device and the task attributes are SCSI task attributes including Simple, Ordered, Head of Queue, and Auto Contingent Allegiance (ACA) task attributes.

Ozdemir ('354) teaches a system that uses multiple storage controllers to divide SCSI and iSCSI protocol tasks (see abstract). Ozdemir ('354) additionally teaches the use of SCSI task attributes (column 1 line 57 through column 2 line 31).

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the remote mirroring system disclosed by Yamagami ('589) such that the remote mirror uses SCSI commands and SCSI task attributes. This modification would have been obvious because some developers are pushing for iSCSI to be a dominant standard for SANs (Yamagami ('589) column 1 lines 38-41) and the use of task attributes allows for ordering of tasks to be preserved (Ozdemir ('354) column 2 lines 25-33).

7. As per claim 2, Yamagami ('589) in view of Ozdemir ('354) discloses the device according to claim 1 further comprising:

the target controller capable of communicating with the initiator and performing operations requested by the initiator as a primary target (Yamagami ('589) column 2 lines 31-33); and

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a process on the target controller that receives a command stream from the initiator that specifies task attributes describing an execution sequence order, and reconveys the commands and task attributes to the secondary target so that the execution order is the same in the primary target and the secondary target (Yamagami ('589) column 2 lines 33-42, the primary storage sends ordering information with the data to the secondary storage).

8. As per claim 3, Yamagami ('589) in view of Ozdemir ('354) discloses the device according to claim 1 further comprising: a process on the target controller that receives a command stream from the initiator that omits specification of task attributes describing an execution sequence order, determines implied task attributes from the command stream based on ordering of tasks, and conveys the commands and implied task attributes to the secondary target, enabling improvement in concurrency in command execution by the secondary target (Yamagami ('589) column 2 lines 33-42, the data is sent to the primary without ordering information embedded in the data, this ordering information is created by the first storage based on the order of the data received, and forwarded to the secondary storage).

9. As per claim 4, Yamagami ('589) in view of Ozdemir ('354) discloses the device according to claim 3 further comprising:

a process on the target controller that determines implied task attributes from the command stream further comprising:

a process that infers an intended precedence graph of a primary initiator by tracking concurrency of issued tasks (Yamagami ('589) column 2 lines 33-35, the order of arrival at the primary storage is noted and is inferred to be the intended ordering); and
a process that conveys the inferred preference graph to the secondary target (Yamagami ('589) column 2 lines 35-39).

10. As per claim 9, Yamagami ('589) in view of Ozdemir ('354) discloses the device according to claim 1 further comprising: a process on the target controller that determines command attributes to ensure correct operation at the secondary target in the absence of the initiator supplying the attributes (Yamagami ('589) column 2 lines 33-42, the primary target infers a sequencing of data from its order of arrival and forwards it to the secondary storage to ensure correct operation at the secondary).

11. As per claim 11, Yamagami ('589) discloses a method of ordering commands in a communication system comprising:

receiving a stream of commands (column 2 lines 29-31);
performing the commands (column 2 lines 31-33);
relaying the commands to a target (column 2 lines 31-42); and
embedding task attributes in the relayed commands to increase concurrency in commands performed by the target (column 2 lines 31-42).

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Yamagami ('589) additionally discloses that some companies are working to make iSCSI a dominant standard for SANs (column 1 lines 38-41).

Yamagami ('589) does not expressly disclose the system wherein the target controller is a Small Computer Systems Interface (SCSI) device and the task attributes are SCSI task attributes including Simple, Ordered, Head of Queue, and Auto Contingent Allegiance (ACA) task attributes.

Ozdemir ('354) teaches a system that uses multiple storage controllers to divide SCSI and iSCSI protocol tasks (see abstract). Ozdemir ('354) additionally teaches the use of SCSI task attributes (column 1 line 57 through column 2 line 31).

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the remote mirroring system disclosed by Yamagami ('589) such that the remote mirror uses SCSI commands and SCSI task attributes. This modification would have been obvious because some developers are pushing for iSCSI to be a dominant standard for SANs (Yamagami ('589) column 1 lines 38-41) and the use of task attributes allows for ordering of tasks to be preserved (Ozdemir ('354) column 2 lines 25-33).

12. As per claim 12, Yamagami ('589) in view of Ozdemir ('354) discloses a method according to claim 11 further comprising:

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inferring an intended precedence of the commands (column 2 lines 33-35, the correct ordering of data is inferred from the order of arrival); and

embedding task attributes in the relayed commands according to the intended precedence to increase concurrency in commands performed by the target (Yamagami ('589) column 2 lines 35-42).

13. As per claim 13, Yamagami ('589) in view of Ozdemir ('354) discloses a method according to claim 11 further comprising:

receiving a command stream that omits specification of task attributes describing an execution sequence order (Yamagami ('589) column 2 lines 28-35, the ordering of data is noted by the intermediary storage, not embedded within the data);

determining implied task attributes from the command stream (Yamagami ('589) column 2 lines 33-35, the correct ordering of data is inferred by the order of data received); and

conveying the commands and implied task attributes to enable improvement in concurrency in commands performed by the target (Yamagami ('589) column 2 lines 35-42).

14. As per claim 14, Yamagami ('589) in view of Ozdemir ('354) discloses a method according to claim 11 further comprising:

receiving at a primary target a command stream from the initiator that specifies task attributes describing an execution sequence order (Yamagami ('589) column 3

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lines 26-40, in an alternate embodiment, there are three storage systems and the data is conveyed from the first to the second to the third. Journal data (including ordering data) is created at the first storage and transferred with the data to the second storage. In this embodiment, the initiator would be the host and the first storage device that creates the journal data); and

reconveying the commands and task attributes from the primary target to a secondary target so that the execution order is the same in the primary target and the secondary target (Yamagami ('589) column 3 lines 26-40, the first storage sends the data with journal data to the second storage, which forwards the data and journal data to the third storage).

15. As per claim 16, Yamagami ('589) in view of Ozdemir ('354) discloses the method according to claim 11 further comprising: determining command attributes to ensure correct operation in the absence of an initiator supplying the attributes (Yamagami ('589) column 2 lines 33-42).

16. As per claim 17, Yamagami ('589) in view of Ozdemir ('354) discloses the method according to claim 11 further comprising:

tracking concurrency of issued tasks (Ozdemir ('354) column 3 lines 54-65);
inferring an intended precedence graph based on the tracked tasks (column 2 lines 33-35, the correct ordering of data is inferred from the order of arrival); and

applying Ordered and Simple task attributes to a stream of pipelined commands to convey a precise execution sequence order for issued commands according to the inferred precedence graph to improve command execution efficiency (Ozdemir ('354) column 10 lines 15-36).

17. As per claim 19, Yamagami ('589) in view of Ozdemir ('354) discloses the method according to claim 11 further comprising: relaying commands in a remote asynchronous mirroring application (Yamagami ('589) column 2 lines 27-28, in a remote copy application, Yamagami ('589) column 35-39, the relay is performed asynchronously).

18. As per claim 21, Yamagami ('589) discloses a method of ordering commands in a communication system comprising:

receiving a stream of command requests (column 2 lines 29-31, from primary to intermediary);

relaying the requested commands (column 2 lines 35-39); and
embedding task attributes in the relayed commands to improve transaction ordering for a remote mirroring application using an ordered transport (column 2 lines 33-42).

Yamagami ('589) additionally discloses that some companies are working to make iSCSI a dominant standard for SANs (column 1 lines 38-41).

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Yamagami ('589) does not expressly disclose the system wherein the target controller is a Small Computer Systems Interface (SCSI) device and the task attributes are SCSI task attributes including Simple, Ordered, Head of Queue, and Auto Contingent Allegiance (ACA) task attributes.

Ozdemir ('354) teaches a system that uses multiple storage controllers to divide SCSI and iSCSI protocol tasks (see abstract). Ozdemir ('354) additionally teaches the use of SCSI task attributes (column 1 line 57 through column 2 line 31).

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the remote mirroring system disclosed by Yamagami ('589) such that the remote mirror uses SCSI commands and SCSI task attributes. This modification would have been obvious because some developers are pushing for iSCSI to be a dominant standard for SANs (Yamagami ('589) column 1 lines 38-41) and the use of task attributes allows for ordering of tasks to be preserved (Ozdemir ('354) column 2 lines 25-33).

19. As per claim 22, Yamagami ('589) discloses an article of manufacture comprising:

a controller usable medium having a computable program code embodied therein for ordering commands in a communication system (column 2 lines 31-42, the recording

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of arrival ordering by the intermediary storage system requires a controller which executes code), the computable program code further comprising:

- a code capable of causing the controller to receive a stream of command requests (column 2 lines 29-31, from primary to intermediary);

- a code capable of causing the controller to perform the requested commands (column 2 lines 31-32, the intermediary stores the data);

- a code capable of causing the controller to infer an intended precedence of the requested commands (column 2 lines 33-35, the intermediary notes the arrival order of the data);

- a code capable of causing the controller to relay the requested commands to a target (column 2 lines 35-42); and

- code capable of causing the controller to embed task attributes in the relayed commands according to the intended precedence to increase concurrency in commands performed by the target (column 2 lines 35-42).

Yamagami ('589) additionally discloses that some companies are working to make iSCSI a dominant standard for SANs (column 1 lines 38-41).

Yamagami ('589) does not expressly disclose the system wherein the target controller is a Small Computer Systems Interface (SCSI) device and the task attributes are SCSI task attributes including Simple, Ordered, Head of Queue, and Auto Contingent Allegiance (ACA) task attributes.

Ozdemir ('354) teaches a system that uses multiple storage controllers to divide SCSI and iSCSI protocol tasks (see abstract). Ozdemir ('354) additionally teaches the use of SCSI task attributes (column 1 line 57 through column 2 line 31).

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the remote mirroring system disclosed by Yamagami ('589) such that the remote mirror uses SCSI commands and SCSI task attributes. This modification would have been obvious because some developers are pushing for iSCSI to be a dominant standard for SANs (Yamagami ('589) column 1 lines 38-41) and the use of task attributes allows for ordering of tasks to be preserved (Ozdemir ('354) column 2 lines 25-33).

20. As per claims 23-25, these claims recite limitation found in claim 22 and are rejected on the same grounds as claim 22.

21. Claims 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozdemir ('354).

Ozdemir ('354) discloses a method of ordering commands in a communication system comprising:

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communicating information via an interact Small Computer Systems Interface (iSCSI) transport protocol (as told in the abstract).

Ozdemir ('354) also discloses the use of task attributes for SCSI commands (column 2 lines 7-12).

Ozdemir ('354) does not explicitly disclose embedding SCSI task attributes in a received command stream to ensure an ordering behavior sufficient for attaining concurrency performance and correct algorithm operation.

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the SCSI distribution system disclosed by Ozdemir ('354) such that the system embeds SCSI task attributes in a received command stream. This modification would have been obvious because task attributes allow for preservation of task ordering (column 2 lines 25-33).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Schell whose telephone number is (571) 272-8186. The examiner can normally be reached on Monday through Friday 9AM-4:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman can be reached on (571) 272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JS



SCOTT BADERMAN
SUPERVISORY PATENT EXAMINER